Table 1. Summary of hypotheses, corresponding specific predictions, and results. We count predictions as fully supported ('yes') when the response is signficant in univariate models and included in all top multivariate models and as partially supported ('yes') when the direction of response consistently matched the prediction but the effect was not significant in all models.

	Prediction supported?				
Hypotheses & Specific Predictions	Overall	1966	1977	1999	Results
Tree size and microenvironment					
1a. Larger, taller trees have lower Rt.					
Rt decreases with stem diameter (DBH).	yes	yes	-	-	Table 4
Rt decreases with height (H).	yes	yes	-	(yes)	Tables 4, 5
1b. Trees with more exposed crowns have lower Rt.					
Dominant trees have lowest Rt.	-	yes	(yes)	-	Tables 4, 5
Correcting for H, dominant trees have lowest Rt.	-	-	-	-	Tables 4, 5
1c. Small trees (lower root volume) in drier microhabitats have lower Rt.					
There is a negative interactive effect between H and topographic wetness index.	-	-	-	-	Table 4
Species traits					
2. Species' traits–particularly leaf hydraulic traits–predict Rt.					
Wood density correlates (positively or negatively) to Rt.	-	-	-	-	Table 4
Leaf mass per area correlates positively to Rt.	-	-	-	-	Table 4
Ring-porous species have higher Rt than diffuse- or semi-ring- porous.	-	yes	-	yes	Tables 4, 5
Percent loss leaf area upon desiccation correlates negatively with Rt.	yes	yes	(yes)	-	Tables 4, 5
Water potential at turgor loss correlates negatively with Rt.	(yes)	-	(yes)	(yes)	Tables 4, 5

Table 2. Summary of variables

variable	symbol	units	description	category	n	observed values median	min	max	ln-transformed?
Dependent variable									
drought resistance	Rt	-	ratio of growth during drought year to mean growth of the 5 years prior.	-	1596	0.87	0	1.99	no
Independent variables									
drought year	Y	-	year of drought	1966	478	-	-	-	-
				1977	547	-	-	-	-
				1999	571	-	-	-	-
tree size									
diameter breast height	DBH	cm	DBH in drought year	-	all	31.92	3.92	134.19	yes
height	H	m	H in drought year	-	all	20.21	4.76	43.87	yes
microhabitat									
crown position	CP	-	2018 crown position	dominant (D)	31	-	-	-	-
				co-dominant (C)	231	-	-	-	-
				intermediate (I)	224	-	-	-	-
				suppressed (S)	101	-	-	-	-
topographic wetness index	TWI	-	steady-state wetness index based on slope and upstream contributing area	-	all	5.66	0	16	yes
species' traits									
wood density	WD	g cm-3	dry mass of a unit volume of fresh wood	-	all	0.62	0.4	1.09	no
leaf mass per area	LMA	kg m-2	ratio of leaf dry mass to fresh leaf area	-	all	48.69	30.68	75.8	no
xylem porosity	XP	-	vessel arrangement in xylem	ring (R)	408	-	-	-	-
				semi-ring (SR)	31	-	-	-	-
				diffuse (D)	178	-	-	-	-
turgor loss point	TLP	MPa	water potential at which leaves wilt	-	all	-2.39	-2.76	-1.92	no
percent loss area	PLA	%	percent loss of leaf area upon dessication	-	all	13.06	8.52	24.64	no

Table 3. Overview of analyzed species, their productivity in the plot, numbers and sizes sampled, and traits. Given are DBH mean and range of cored trees, the number of cores represented by each crown position of each species, and mean hydraulic trait measurements.

species	percent.ANPP	n.cores	mean.DBH_cm	DBH.range_cm	xylem.porosity	PLA_percent	LMA_g.per.cm2	TLP_Mpa	WD_g.per.cm3
Liriodendron tulipifera	47.1	109	36.9	90.4	diffuse	19.56	46.92	-1.92	0.40
Quercus alba	10.7	66	47.2	67.7	ring	8.52	75.80	-2.58	0.61
Quercus rubra	10.1	71	54.9	136.9	ring	11.01	71.13	-2.64	0.62
Quercus velutina	7.8	83	54.1	98.2	ring	13.42	48.69	-2.39	0.65
Quercus montana	4.8	67	42.2	76.7	ring	11.75	71.77	-2.36	0.61
Fraxinus americana	3.8	69	35.4	88.3	ring	13.06	43.28	-2.10	0.56
Carya glabra	3.7	39	31.4	88.7	ring	21.09	42.76	-2.13	0.62
Juglans nigra	2.1	31	48.1	62.8	semi-ring*	24.64	72.13	-2.76	1.09
Carya cordiformis	2.0	17	27.2	50.8	ring	17.22	45.86	-2.13	0.83
Carya tomentosa	2.0	18	21.0	20.1	ring	16.56	45.36	-2.20	0.83
Fagus grandifolia	1.5	81	23.5	96.0	diffuse	9.45	30.68	-2.57	0.62
Carya ovalis	1.1	24	35.3	51.1	ring	14.80	47.60	-2.48	0.96

*Semi-ring porosity is intermediate between ring and diffuse. We group it with diffuse-porous species for more even division of species between categories.

Table 4. Univariate models

			all droughts		1966		1977		1999	
variable	category	null variables	dAICc	coefficients	dAICc	coefficients	dAICc	coefficients	dAICc	coefficients
drought year	1966		-2.42	0.0000	-	-	-	-	-	-
	1977		-	-0.0209	-	-	-	-	-	-
	1999		-	-0.0105	-	-	-	-	-	-
ln[DBH]		Y	8.17	-0.0385	15.32	-0.0888	-0.87	-0.0214	-1.93	0.0057
ln[height]		Y	8.17	-0.0620	15.32	-0.143	-0.87	-0.0345	-1.93	0.0092
crown position	D	Y	-2.96	-0.0461	3.25	-0.0509	0.66	-0.0759	0.38	-0.0103
(alone)	C		-	0.0000	-	0	-	0	-	0
	I		-	-0.0063	-	0.0732	-	-0.0298	-	-0.0563
	S		-	0.0122	-	0.0526	-	0.0432	-	-0.0483
crown position	D	ln[H]+Y	0.57	-0.0347	-1.84	-0.0328	-0.23	-0.073	3.04	-0.0024
(with height)	C		-	0.0000	-	0	-	0	-	0
	I		-	-0.0425	-	0.0139	-	-0.0388	-	-0.081
	S		-	-0.0582	-	-0.0662	-	0.0258	-	-0.0956
ln[TWI]		ln[H]+Y	5.34	-0.0890	-1.96	-0.0171	5.05	-0.1404	2.8	-0.1033
ln[TWI]*ln[H]		ln[H]+ln[TWI]+Y	-0.83	0.0824	-1.58	0.0958	-1.47	0.089	-1.9	0.0428
wood density		ln[H]+Y	-1.91	-0.0479	-1.24	-0.2089	-1.22	-0.1812	0.22	0.2502
leaf mass per area		ln[H]+Y	-1.99	0.0003	-1.88	0.0012	-1.76	-0.0013	-2	0.0004
xylem porosity	R	ln[H]+Y	-0.71	0.0660	2.305	0.1888	1.399	-0.1452	3.765	0.1544
	D/SR		-	0.0000	-	0	-	0	-	0
turgor loss point		ln[H]+Y	1.33	-0.1777	-1.64	-0.1078	1.26	-0.25	0.016	-0.1732
percent loss area		ln[H]+Y	7.17	-0.0140	9.18	-0.0249	-0.05	-0.0105	-0.716	-0.0074

Table 5. Summary of R$\hat{2}$ and coefficients of the best multivariate models for each drought instance. Models are ranked by AICc, and we show all models whose AICc value falls within 1.0 (dAICc<1) of the best model (bold).

					crown position					xylem architecture			
drought	dAICc	R2	Intercept	ln[H]	D	C	I	S	ln[TWI]	D/SR	R	PLA	TLP
all	**0.000**	**0.12**	**1.085**	**-0.059**	**-**	**-**	**-**	**-**	**-0.086**	**-**	**-**	**-0.012**	**-0.113**
	0.586	0.11	1.373	-0.057	-	-	-	-	-0.086	-	-	-0.013	-
	0.726	0.12	1.232	-0.092	-0.034	0	-0.037	-0.051	-0.079	-	-	-0.012	-0.101
	0.813	0.11	1.493	-0.092	-0.034	0	-0.039	-0.054	-0.079	-	-	-0.014	-
1966	**0.000**	**0.25**	**1.523**	**-0.146**	**-**	**-**	**-**	**-**	**-**	**0**	**0.11**	**-0.021**	**-**
1977	**0.000**	**0.21**	**1.136**	**-**	**-**	**-**	**-**	**-**	**-0.145**	**0**	**-0.205**	**-0.015**	**-0.13**
	0.040	0.21	1.490	-	-	-	-	-	-0.145	0	-0.22	-0.017	-
	0.505	0.22	1.089	-	-0.069	0	-0.025	0.043	-0.137	0	-0.199	-0.014	-0.143
	0.818	0.22	1.481	-	-0.07	0	-0.027	0.038	-0.136	0	-0.216	-0.017	-
1999	**0.000**	**0.23**	**0.464**	**-**	**-**	**-**	**-**	**-**	**-0.095**	**0**	**0.16**	**-**	**-0.197**
	0.019	0.24	0.735	-0.07	0	0	-0.077	-0.09	-0.084	0	0.167	-	-0.183

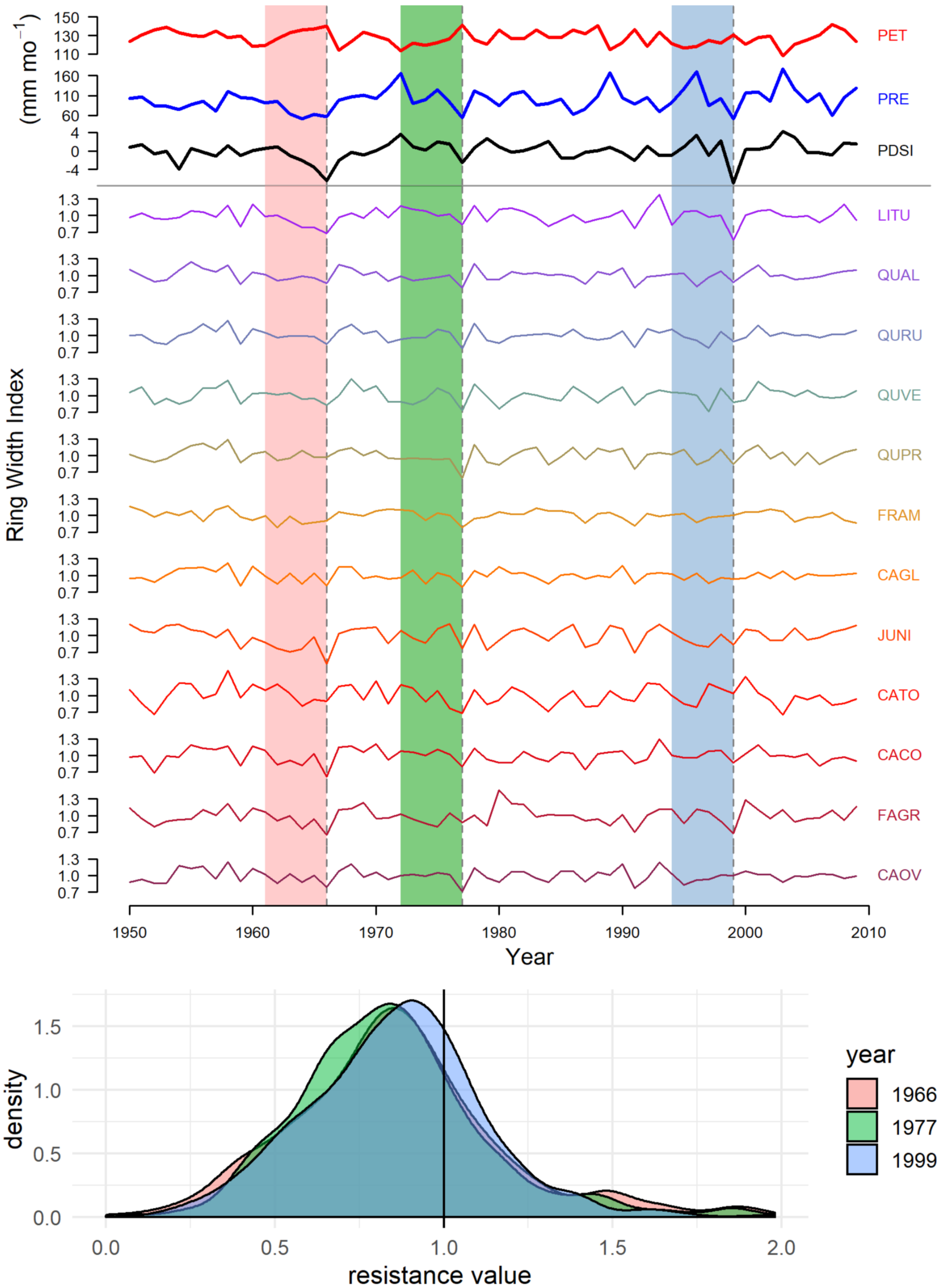

Figure 1. Climate and species-level growth responses over our study period, highlighting the three focal droughts (a) and community-wide responses Time series plot (a) shows peak growing season (May-August) climate conditions and residual chronologies for each species. Focal droughts are indicated by dashed lines, and shading indicates the pre-drought period used in calculations of the resistance metric. Figure modified from Helcoski *et al.* (2019). Density plots (b) show the distribution of resistance values for each drought.

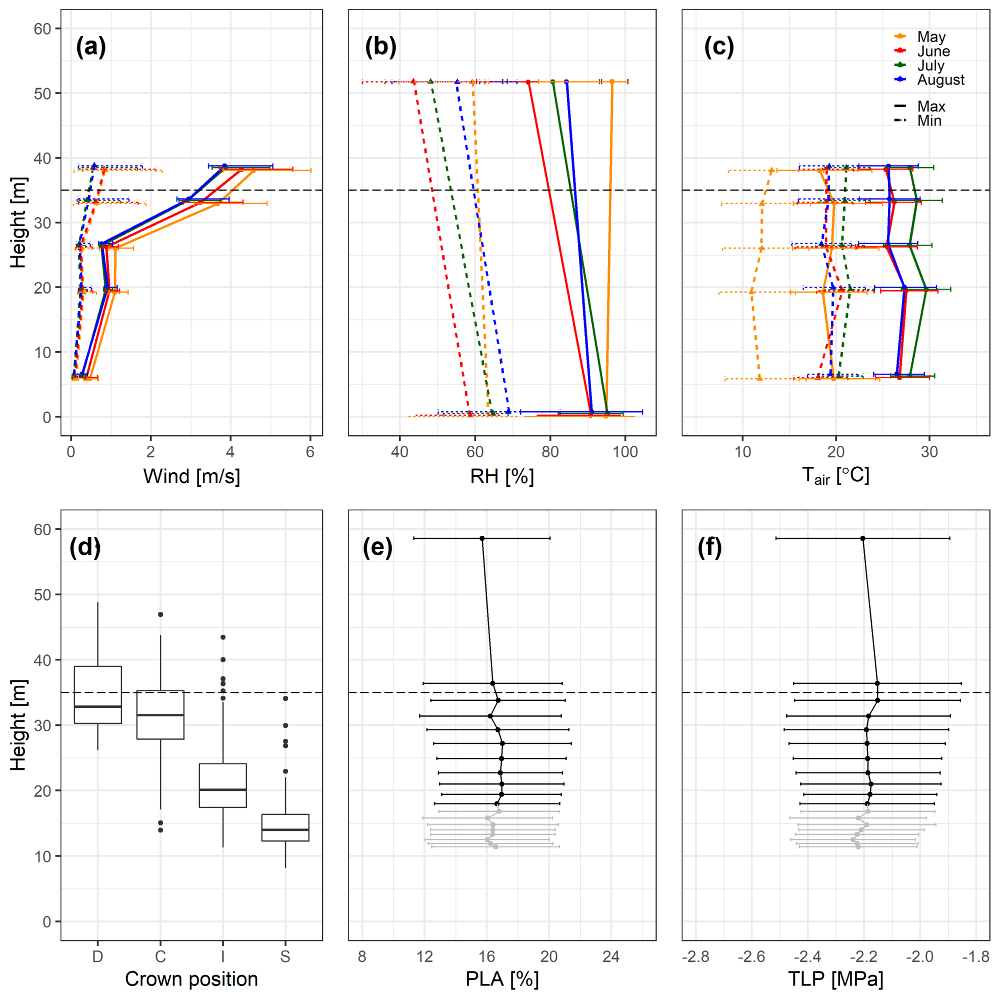

Figure 2. Height profiles in growing season climatic conditions, tree heights by crown position, and leaf hydraulic traits The top row shows averages (± SD) of daily maxima and minima of (a) wind speed, (b) relative humidity (RH), and (c) air temperature (T_{air}) averaged over each month of the peak growing season (May-August) from 2016-2018. In these plots, heights are slightly offset for visualization purposes. Also shown are (d) 2018 tree heights by canopy position (see Table 2 for codes) and vertical profiles in (e) PLA_{dry} and (f) π_{tlp}. In (e-f), values are community-wide averages across height bins (plotted at upper end of height bin), with grey indicating bins for which species-level trait measurements are available for <75% of individuals. In all plots, the dashed horizontal line indicates the 95th percentile of tree heigts in the ForestGEO plot.